

AMMAD PIR

ID # 6961

* Characteristics of Computer Memory:-

Ans
a) List of MEMORY DEVICES:-

- Location
- Capacity
- Unit of Transfer.
- Access Method
- Performance.
- Physical type.
- Physical Characteristics.
- Organization.

(b) CACHE MEMORY Policies:-

One of the central caching policies is known as write through. This means that data is stored and written into the cache and to the ~~memory~~ primary storage device at the same time. One advantage of this policy is that its it ensures information will be stored safely without risk of data loss.

~~Cache Evolution in Microprocessors:~~

(d) Physical Characteristics of Magnetic Disk System:-

Ans. Each disk platter has a flat circular shape.

- The disk surface is logically divided into tracks, which are subdivided into sectors.
- The arm can be positioned over any one of the tracks.
- The platter is spun at high speed.
- To read information, the arm is positioned over the correct track.

(e) Different RAID SCHEME:-

Each scheme, or RAID level, provides a different balance among the key goals: reliability, performance and capacity. RAID levels greater than RAID 0 provides protection against unrecoverable sector read errors, as well as against failures of whole physical drive.

(3)

(c) Cache Evaluation in Intel Microprocessor:-

The microprocessor is the heart of any computer system. A microprocessor is a computer processor which incorporates the function of a computer's central processing unit (CPU) on a single integrated circuit (IC), or at most a few integrated circuit.

The microprocessor is a multipurpose, clock driven register based, digital integrated circuit which accepts binary data input process it according to instruction stored in its memory and provide result as output.

(4)

(b) Q2:- ~~SRAM~~ SRAM CELL:-

A typical SRAM cell is made up of six MOSFET. Each bit in an SRAM is store on four transistors (M_1, M_2, M_3, M_4) that form two cross-coupled inverters. This storage cell has two stable which are used to denote 0 and 1.

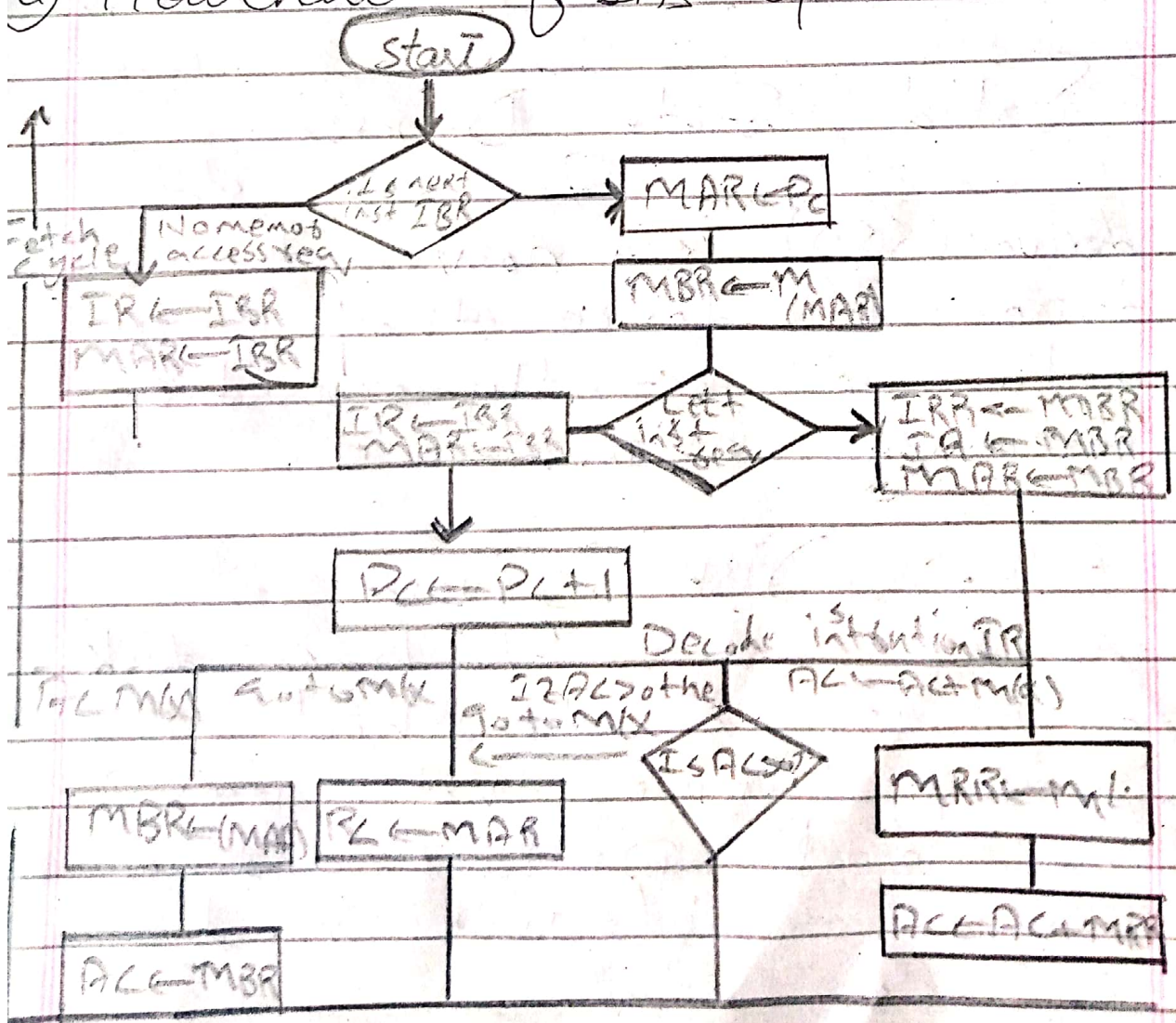
(c) 16-Mbit DRAM Organization:-

4bits are read and written at a time. Memory array is organized as 4 square - arrays of 2048×2048 elements. Elements are connected by both horizontal (rows) and vertical (columns) line. Each horizontal line connects to the select terminal of each cell in its row.

ii) Magnetic Disk READ/Write System:-

Disk read/write heads are the small parts of a disk drive which move above the disk platter and transform the platter's magnetic field into electrical current (read the disk) or, vice versa, transform electrical current into magnetic field (write the disk).

a) Flowchart of IAS Operation.



(6)

Q3^(a)

Unified and Split Caches:-
A split cache is a cache that consists of two physically separate parts, where one part, called the instruction cache is dedicated for holding instructions and the other called the data cache is dedicated for holding data (i.e. instruction memory operands). A cache that is not split is called a unified cache.

(b) **Solid State Drives:-**

A solid state drive (SSD) is a newer faster type of device that stores data on instantly-accessible memory chips.

HARD DISK Drive:-

A hard disk drive is an old-school storage device that uses mechanical platters and a moving read/write head to access data.

(7)

(c) Constant angular Velocity (CAV) and multiple zone recording (MZR)?

For the constant angular velocity (CAV) system the number of bits per track is constant. An increase in density is achieved with multiple zoned recording, in which the surface is divided into a number of zones, with zones farther from the center containing more bits than zones closer to the center.

(d) HD DVD and Blu-ray DVD:-
HD DVD players have been much cheaper than Blu-ray machines, but Blu-ray discs have more storage space and more advanced protections against piracy. Both versions deliver sharp resolution. Blu-ray has 25GB capacity (50GB dual layer) and is more expensive.

(8)

(B) Q4. ~~Suppose an 8-bit data word stored in memory is 1010111?~~

(a)
(c)

Ans:-

11

Q4A) Solve each of the following:-

(1) Tag, line, and word value for a direct-mapped cache.

(b)

(a) Address	111111	666666	B88888
Tag/line/word	11/444/1	66/199/2	B8/288/3

(b) Tag and word value for associative cache.

(b) Tag/word	44444/1	199999/2	288888/3
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(c) Tag, Set, word values for a two-way set associative cache.

(c) Tag/Set/word	22/444/1	CC/1999/2	177/888/3
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(c)

(c) Average Seek time:-

The mean time it takes to move the head of a disk drive from one track to another averaged over the source and destination cylinders. Usually measured in milliseconds (ms).

(b) Average Rotational Latency:

Thus on average, the rotational latency is half the time it takes the disk to make a complete revolution. The disk spins at 10000 RPM so it takes $1/10000$ of a minute to make one revolution. Equivalently, $(1000 \text{ ms/sec} \times 60 \text{ sec/minute})$ 1000 RPM = 6ms to make one revolution. So rotational latency is 3ms.

(c) Transfer Time for a Sector:

The transfer time is given by the number of sectors
Rotation time track capacity
in a number of sectors - e.g
If there are S + sectors

(10)

per track the time to transfer on sectors would be $1/s + \alpha$ of a revolution.

(d) Total average time to satisfy a request :-

Consider a single platter disk with the following parameters: rotation speed 7200 rpm; number of tracks on one side of platter 3000; number of sectors per track: 600.

Q4(a) For the main memory address FEDCB7H show following information in hexadecimal:

Ans

OPcode	OPexands
00000000	0000000001